

PATENT CLAIMS

1. Catalyst support body (1) having a surface (2) on which a coating (3),
bonded to the surface, is provided, the catalyst support body (1) being a dimple plate and
5 the coating being applied to the outer side of the dimple plate.

2. Catalyst support body (1) according to claim 1, wherein the coating (3)
has fissures (4) having a length (5), those lengths exhibiting a total fissure length of at
most 500 m/m^2 [meters per square meter].

3. Catalyst support body according to claim 1 or 2, wherein the coating (3)
10 has an adhesive tensile strength of at least 500 N/m^2 [Newtons per square meter].

4. Catalyst support body (1) having a surface (2) on which a coating (3),
bonded to the surface, is provided, the coating (3) having fissures (4) having a length (5),
those lengths exhibiting a total fissure length of at least 500 m/m^2 [meters per square
meter] and the coating (3) having an adhesive tensile strength of at least 500 N/m^2
15 [Newtons per square meter].

5. Catalyst support body (1) according to any one of the preceding claims,
the coating (3) having a layer thickness (6) of at least 0.02 mm [millimeters].

6. Catalyst support body (1) according to claim 4 or 5, the coating (3) having
fissures (4) having a length (5), the total fissure length being at least 1000 m/m^2 [meters
20 per square meter].

7. Catalyst support body (1) according to any one of claims 4 to 6, wherein
the catalyst support body has a first thermal expansion coefficient and the coating (3) has
a second thermal expansion coefficient, the two thermal expansion coefficients differing,
at least at a temperature in the range of from 20°C to 650°C , by at least 10%.

8. Catalyst support body (1) according to any one of the preceding claims, wherein the coating (3) is a catalytically active coating (3) for partial oxidation of propene and acrolein.

9. Catalyst support body (1) according to any one of the preceding claims,
5 wherein the coating (3) comprises at least one inert constituent (7).

10. Catalyst support body (1) according to any one of the preceding claims, wherein the coating (3) comprises at least one constituent (7) containing silicon or aluminum and oxygen.

11. Catalyst support body (1) according to any one of claims 4 to 10, wherein
10 the catalyst support body (1) is constructed using metallic material.

12. Catalyst support body (1) according to any one of claims 4 to 11, wherein the catalyst support body (1) comprises a multi-walled sheet structure (8) with at least one channel (9) through which a fluid is able to flow.

13. Catalyst support body (1) according to claim 11 or 12, wherein the
15 catalyst support body (1) comprises a plurality of plates (10) and the latter form openings (11) through which a fluid is able to flow.

14. Catalyst support body (1) according to any one of claims 4 to 10, wherein the catalyst support body (1) is constructed using ceramic material.

15. Reactor (25) for the preparation of polymerizable monomers having at
20 least one reaction chamber (12) through which a fluid is able to flow, the at least one reaction chamber (12) comprising at least one catalyst support body (1) in accordance with any one of the preceding claims.

16. Process for the production of a coating (3) on a surface (2) of a dimple plate as catalyst support body (1), which comprises at least the following steps:

- preparation of a solid/fluid phase with a catalyst suitable for the preparation of an organic molecule containing at least one double bond and oxygen,
- 5 - application of the solid/fluid phase to an outer side of the dimple plate, or
- formation of a coating (3) on the outer side of the dimple plate.

17. Process for the production of a coating (3) on a surface (2) of a catalyst support body (1), which comprises at least the following steps:

- preparation of a solid/fluid phase with a catalyst suitable for the preparation of an organic molecule containing at least one double bond and oxygen,
- 10 - application of the solid/fluid phase to a catalyst support body (1), or
- formation of a coating (3) having fissures (4) having a length (5), the total fissure length being at least 500 m/m² [meters per square meter].

18. Process according to claim 16 or 17, wherein prior to the application of the solid/fluid phase the catalyst support body (1) is subjected to adhesion-enhancing treatment.

19. Process according to claim 18, wherein at least one of the following steps is carried out, especially in respect of catalyst support bodies (1) of metallic material:

- a) abrasive blasting of the surface (2),
- 20 b) machining of the surface (2),
- c) cleaning of the surface (2), or
- d) thermal treatment of the surface (2).

20. Process according to any one of claims 16 to 19, wherein application of the solid/fluid phase is effected at least in accordance with one of the following steps:

25 spray-application, spreading, pouring, immersion.

21. Process according to any one of claims 16 to 20, wherein the catalyst support body (1) is dried after application of the solid/fluid phase.

22. Process according to any one of claims 16 to 21, wherein the coating (3) is formed by calcining.

5 23. Process according to any one of claims 16 to 22, wherein the applied coating (3) is brought into contact with at least one further solid/fluid phase for impregnation of catalytically active materials.

24. Process according to claim 23, wherein the impregnated coating (3) is subjected to a thermal treatment.

10 25. Process according to any one of claims 16 to 24, wherein the applied coating (3) is reduced.

26. Process according to any one of claims 16 to 25, wherein the catalyst support body (1) is at least partially elastically deformed, so that fissures (4) are formed in the coating (3).

15 27. Process for the preparation of an organic molecule containing at least one double bond and oxygen, in which process an organic molecule containing at least one double bond is brought into contact with oxygen in the presence of a catalyst support body (1) according to any one of claims 1 to 14.

20 28. Process for the preparation of an organic molecule containing at least one double bond and oxygen, in which process an organic molecule containing at least one double bond is brought into contact with oxygen in at least one reactor (25) according to claim 15.

29. Process for the production of a water-absorbing polymer, wherein a purified acrylic acid, obtainable from a process according to either one of claims 27 and 28 in the form of an organic molecule containing at least one double bond, is polymerized.

5 30. Process for the production of a water-absorbing hygiene article, wherein a water-absorbing polymer, obtainable according to claim 29, is combined with at least one hygiene article constituent.

31. Fibers, moulded articles, films, foams, super-absorbing polymers, detergents, special polymers for the fields of wastewater treatment, disperse dyes, cosmetics,
10 textiles, leather finishing or paper manufacture, or hygiene articles, at least based on or containing an organic molecule containing at least one double bond and oxygen, obtainable in accordance with a process according to claim 27 or 28.

32. Use of an organic molecule containing at least one double bond and oxygen, obtainable in accordance with a process according to claim 27 or 28, in or for
15 the production of fibers, moulded articles, films, foams, super-absorbing polymers or hygiene articles, detergents or special polymers for the fields of wastewater treatment, disperse dyes, cosmetics, textiles, leather finishing, or paper manufacture.